

BSc Physics, PhD Electronic Systems Engineering

Research

Current research interests include: environmental wireless sensor networks, Internet of Things, Web of Things. In the EU VASARI project I helped design the world's first high resolution colorimetric imager for paintings. The MARC EU project with the National Gallery and the Technical University of Munich developed a camera which was eventually used to capture their entire collection directly for the first time. In Viseum a new system was designed to allow web browsers to view high resolution images (which became [IIPimage](#)). These projects led to the [VIPS](#) image processing library still in use worldwide. ACOHIR expanded the imaging and viewing of 3D objects. Artiste made a system for retrieving art images based on their content and allowed cross-collection searching through web services. SCULPTEUR added the use of ontologies and 3D object searching by similarity in shape. EU eCHASE extended the technology for commercial use by picture libraries. Research since 2002 focused on environmental sensor networks. Starting with the Glacsweb project on glacier sensing leading to the world's first sub-glacial sensor node. The EU SensorGrid4Env on sensor webs for the environment led to the [SSN](#) Ontology. Recent projects use Internet of Things methodologies for environmental sensing.

Impact

My research results are being used regularly in image handling (VIPS, IIPimage), environmental monitoring (new data sources for earth science). Imaging systems I have built for major museums and humanities researchers have captured thousands of unique images.

Prizes

Vice Chancellor's Teaching Award for innovative teaching in 2013

Vice Chancellor's Award for outreach work in 2014.

AGU Leptoukh award 2017.

Professional Memberships

Member of the Peer review college EPSRC.

Member of the IEEE.

Executive Committee of the Earth and Space Sciences Informatics (ESSI) group of the AGU

Selected Recent Publications (see also [Google Scholar](#))

Martinez, K., Hart, J.K., Basford, P.J., Bragg, G, Ward, T. Young, D.S. (2017), A geophone wireless sensor network for investigating glacier stick-slip motion. *Computers & Geosciences*, Vol. 105, pp. 103-112.

Hart, J K. and Martinez, K (2015) Towards an Environmental Internet of Things [IoT] *Earth and Space Science*, 2, pp. 1-7.

Fabre, Arthur, Martinez, K, Bragg, G, Basford, P, Hart, J, Bader, S and Bragg, O (2016) Deploying a 6LoWPAN, CoAP, low power, wireless sensor network, *ACM Conference on Embedded Networked Sensor Systems*.

Bragg, O M., Basford, P, Black, A R., Bragg, G, Hart, J and Martinez, K (2016) Britain's highest bog: can we unlock its secrets? *15th International Peat Congress 2016*, Malaysia. 15 – 19 Aug 2016. 5 pp.

Ward, T, Martinez, K and Chown, T (2014) Simulated analysis of connectivity issues for sleeping sensor nodes in the internet of things At *The 17th ACM International Conference on Modeling, Analysis and Simulation of Wireless and Mobile Systems*, Canada. 21 – 26 Sep 2014. , pp. 101-108.

Bragg, G., Martinez, K., Basford, P. and Hart, J. (2016) 868MHz 6LoWPAN with ContikiMAC for an internet of things environmental sensor network At *SAI Computing Conference 2016*, United Kingdom. 13 – 15 Jul 2016.

Young, D., Martinez, K, Hart, J.K., (2015) Image analysis techniques to estimate river discharge using time-lapse cameras in remote locations, *Geoscience and Computers*, pp. 1-10,

Hare, J., Dupplaw, D., Lewis, P. H., Hall, W. and Martinez, K. (2014) [Exploiting multimedia in creating and analysing multimedia Web archives](#). [in special issue: Archiving Community Memories] *Future Internet*, 6, (2), 242-260.

Earl, G., Martinez, K. and Malzbender, T. (2010) Archaeological applications of polynomial texture mapping: analysis, conservation and representation. *Journal of Archaeological Science*, 37 .

Martinez, K. and Isaksen, L. (2010) The semantic web approach to increasing access to cultural heritage. In: *Revisualizing Visual Culture*, pp. 29-44, Ashgate

Robidoux, N., Gong, M., Cupitt, J., Turcotte, A. and Martinez, K. (2009) CPU, SMP and GPU implementations of Nohalo level 1, a fast co-convex antialiasing image resampler. *Proceedings of the 2nd Canadian Conference on Computer Science and Software Engineering* . pp. 185-195.

Hart, J.K. and Martinez, K. (2006) Environmental Sensor Networks: A revolution in the earth system science? *Earth-Science Reviews*, 78 . pp. 177-191.

K. Martinez (2014), “How did the future look? A retrospective on art imaging”, invited EVA conference talk at the British Computer Society.

L. Isaksen and K. Martinez (2012) “Archaeology and the semantic web”, *Computer Applications and Quantitative Methods in Archaeology*.

Selected Media Coverage

Canadian Broadcasting Corp. News – live interview on climate change research 2007.

BBC technology web pages – article on Tijuana research 2009.

Vision systems design “Polynomial texture mapping reveals secrets of Roman painting” 2009.

BBC Radio 4 Digital Planet interview 2010.

The Guardian “Scientists develop sensor to predict freak weather, from flash flooding to landslides” - interview on Glacsweb 2010.

Pys.org “Technology helping to crack oldest undeciphered writing system” 2012.

Discovery.com “Digital Fingerprints for Art Could Thwart Heists” 2012.

Research Funding

[VASARI](#) - world's first hi-resolution colorimetric scanner for paintings (EU)

[MARC](#) - Methodology for Art reproduction in Colour - 20k x 20k camera. (EU)

[Viseum](#) - virtual museums networking, (EU)

[ACOHIR](#) - object imaging and web browsing, (EU)

[Artiste](#) - Content based retrieval of art images, (EU)

[Sculpteur](#) - Semantic Web and Content based retrieval of 3D museum objects, (EU)

[eCHASE](#) - semantic integration of photo libraries (incl. Getty Images) , (EU)

[Glacsweb](#) - sensor networks for Glaciers (DTi, NERC, EPSRC, ARM, Leverhulme)

[sensorsgrid4env](#) - semantic web meets sensor networks, (EU)

[Tijuana Estuary sensing](#), (NOAA)

[ARCOMEM](#) – image retrieval (EU)

[COSCH](#) - colour and space in cultural heritage (EU COST)

[mountainsensing](#) - IoT sensing proof of concept (NERC)

novel IoT human interfaces (Innovate-UK)

[Ice-tracking](#) research (Formula E)